

# THE NAZI ATTACK ON INTERNATIONAL SCIENCE

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THE  
THINKER'S  
FORUM

# THE MODERN WORLD

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THE CAUSE  
OF OUR  
TROUBLES?** Emotionally minded folk often try to solve these modern problems by appealing to the irrational feelings that sometimes surge up within most of us. Yet,

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*J. D. Roberts*

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## THE NAZI ATTACK ON INTERNATIONAL SCIENCE

FOR the past eight years international science, that great scientific movement of thought which began on the continent of Europe about the fifteenth century, has been facing the gravest crisis of its history, and on the continent of its birth. It was to the accompaniment of scientific advances that the old Christian Middle Ages disappeared, and now there threatens a new Middle Ages, not rude, peasant, and religious, but highly technical, urban, and based on the paganism of the newspaper reader who wants to be taken out of himself by some great movement, no matter what. In this new Dark Age superstition will triumph over reason, science will be retained only in so far as it is necessary for a narrow technology, and this technology will be applied not for the common good of humanity but for the domination of power-seeking groups by force of terrible armaments.

### *The Development of Modern Science*

It will be generally allowed that all the nations of Europe have contributed in turn to the development of modern science. In the fifteenth and sixteenth centuries it was mainly the Italians and the Hollanders who set the ball rolling, the former by the discoveries of a Leonardo or a Galileo no less than by the Lombard invention of banking and financial techniques; the latter by the free atmosphere which the early capitalist centres such as Antwerp provided, both for trade and scientific invention. In the seventeenth century the

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English made perhaps their greatest contribution; it was the century of Harvey and Newton, and it saw the foundation of the greatest of all scientific societies, the Invisible College of 1649, which later became the Royal Society of London. The early Fellows of that Society were nearly all, as has been shown, of Puritan connections, and this, like the fact that the University of Cambridge was on the Parliamentary side during the English civil war, was no coincidence, for that war can be understood only as the first triumph of the rising capitalist middle class over the feudal aristocracy and the mediæval religious conceptions of society. Science and the improvement of trade and husbandry were growing up together.

When, however, we come to the eighteenth century the English movement had spent its force, and the spirit passed to France, where the Encyclopædistes and other writers of the enlightenment period prepared the way not only for the further political advances of the French Revolution (analogous to the English civil war), but also for the great achievements of French science. Biologists like Bonnet, Buffon, Trembley, Lamarck, and Cuvier, and astronomers like Laplace, were able to say of their sciences what the great Lavoisier (though himself a victim of revolution) said of his: "La révolution en chimie est faite." Then in the second half of the nineteenth century German science produced its best contributions. In every field—in chemistry and medicine and biology, in physics and engineering—German genius powerfully set its stamp on international science. The names of Roux and Koch, of Helmholtz and Röntgen, of Müller and Liebig and Kekulé, to mention no more, suffice to illustrate this.

It is worth while pointing out these historical facts, partly because the present racial prejudices of the nazis go entirely counter to them, and partly also because enmity to the governments at present in power in Germany and Italy is not enmity to German and Italian culture in themselves. On the contrary, everyone

must deeply admire these achievements, and hope that after the present nightmare is over their peoples will be restored to the proper inheritance of them. I was myself once a student at the University of Freiburg in Breisgau—indeed, I think the first English student to reach there after the war of 1914–18. The subject in which I am primarily interested—experimental morphology and embryology—has a German name, given it by its first founder, William Roux, *Entwicklungsmechanik*, which we always affectionately retain. The great traditions of German culture are among the greatest of Europe. Nor on the other hand will this pamphlet constitute any defence of British imperialism. All my political life in England has been in association with the Labour movement, and as such in complete opposition to traditional imperialist sentiments and policies. Like many members of the Labour movement in England, I hope to see much closer contact between the British democracies and the United States. I believe it would be greatly to the benefit of both, and I hope that when the present danger has passed we shall not again succumb to the old centrifugal tendency and go our separate ways. Anglo-American democracy is historically a unity, and the close re-association of its parts can only be for the good of the whole world.

The purpose of the present paper is to examine the nature of nazism, especially in regard to its attack on international science and learning. In probing the facts about the persecution, and exiling, and even murder, of men of learning on account of their race, their faith, or their political beliefs; the suppression of universities and intellectual centres; the abolition of free thought and research; and the concentration of intellectual effort on destructive ends, it is necessary to see what are the statements of the theoreticians of régimes which have put and are actually putting this across. Only in this way can we understand the full force of the evil power which has come into the world.

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Such an examination cannot be made without certain difficulties, because only a very small part of the writings of the nazi theorists are available in English translation, and their statements are little better known in England than they are in the United States.\*

### *The Development of Nazism and Fascism*

The first problem which confronts us, therefore, is the intimate nature of nazism and fascism. Without some definite conception of this we can hardly hope to analyse the nature of their attack on science and learning. Now it would seem that nazi-fascism is essentially a by-product of a vast transition which is going on all around us, a transition from individualistic capitalist economics and all that that implies to some form of collectivism, whether closely modelled on present conceptions of socialism or communism we do not know. It is hardly deniable that we are in the midst of a sacerdotal trend towards a more highly integrated and organized form of society. And just as the transition from feudal aristocracy and kingship to capitalist democracy with its republican forms was accompanied, during the three centuries which it took to accomplish itself, by a number of violent wars and upheavals—the peasant wars in Germany and Bohemia, the Thirty Years' War, the English Civil War, and the French Revolution—so we could hardly expect that so great an economic and social transition as we are envisaging could take place without analogous disturbances and social earthquakes. This point of view has long been

\* There are certain useful books which summarize them, such as Aurel Kolnai's *The War against the West* (London, 1938), but even those concentrate on the sociological and philosophical side, neglecting the distortions of scientific presentation which the nazis have brought to such perfection. See also K. Obermann in *Zeitschr. f. freie deutsche Forschung* (Paris, July, 1938), and E. Unger in *Universities Review*, 1940, vol. 12, p. 53. Unless otherwise given, references to books of authors quoted in what follows will be found in Kolnai's book.

familiar, but a striking statement of it was made by Margaret Cole in the first issue of the British magazine *Fact* (April, 1937).

Now nazism might well be termed the apotheosis of gangsterism, the colossal prototype of all those systems which make hay for themselves while the sun shines. There are those in Europe who erroneously suppose that gangsterism was an American invention. Against this it may be pointed out that the Greek city-states and the towns of the Italian renaissance probably knew a thing or two about gangsterism. It is a social phenomenon which, like certain biological phenomena, always or often appears when external conditions are just right for it. The conditions for its appearance on a colossal scale in the history of Europe are those which govern all racketeering—namely, the presence of two relatively powerful groups between whom exist relations of mutual fear. In such a situation the racketeer can enter between them and make his money or other benefits by playing off one against the other. Some such situation has surely been true both in the Labour Movement rackets and the Prohibition rackets in the United States. In the former case the mutual suspicion and fear between Capital and Labour provided all the necessary conditions; in the latter case the Government on the one hand had the armed police forces, while the people on the other hand had the inextinguishable intention of paying for a million drinks whatever the mechanism of their supply might be. And then just as there are parasites on parasites, so there were racketeers who exploited racketeers, and so on.

Hitler's unique political genius (whether conscious or not is perhaps uncertain) lay therefore in playing on the mutual fear of those he intended to govern. In the early days of the nazi movement some of the party speakers got the big business men into the big hotels and said to them, "We alone can guarantee to save you from Bolshevism," while others went among the working masses and said, "Only by following us will you

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get socialism in this century in Germany." After all, I saw it with my own eyes. Working at the Kaiser-Wilhelm Institut f. Biologie in Dahlem in Berlin in 1933 I saw on the first nazi May Day the banners going by with inscriptions such as "*Nur ein starkes Deutschland kann Arbeit und Brot geben.*" One might have thought that the world co-operative commonwealth would best give all of us bread and work, but for Germans it had to be a strong Germany and hence a miserable everybody else.

The question of exactly how far the promise to the working masses has been broken by the nazis is an interesting one; but most economists consider that no true socialist measures have been introduced in Germany. Regulation of profits is not much of a step towards the nationalization of essential industries when profits are guaranteed at the same time. The "*Kraft durch Freude*" and similar movements are little more than a meaningless façade when the only openings for men are in the army and for women the slavery of the munitions factory or domestic service. But the significant thing is that in the twentieth century, in order to succeed in their aim of winning power in Germany, the nazis had to adopt, at any rate, socialist phraseology and an appearance of socialist propaganda.

What had been so successful in the internal situation was then applied to the international one. Just as the nazis rose to power within Germany by playing on the mutual fear of the capitalist classes and the working masses, so the same policy was possible as between nations, and the nazis faithfully carried it out. To the capitalist democracies of the West their propaganda took the line, "We are your only possible bulwark against the barbarous Mongolian Bolshevik Asiatics," and to the Kremlin they privately said, "You had better play ball with us if you want to see Franco-British capitalism in serious trouble in the near future." It must by now be fairly clear that the reason why the French and British

peoples went into the present war in so great a state of unpreparedness was because the former Governments of Daladier and Chamberlain never for a moment believed that Hitler would attack the West; they expected him to attack the U.S.S.R., and indeed gave him considerable help from time to time on that supposition without even taking out the obvious insurance policy. And the conclusion emerges that nazi-fascism could not have preceded the establishment of socialism in the Soviet Union, not because it borrowed certain minor techniques and certain floutings of traditional morality from communist theory, but because, unless there had been a sociological magnetic pole in the East to match the magnetic pole in the West, there would have been no opportunity for the colossal racket which has captured the machinery of government in Germany and Italy at least as effectively as any racketeers in the bad old days captured the municipal machinery of any American city.

So much for the mechanism whereby nazi-fascism has come into existence. Its existence seems to be a function of the "fear-field" of "social magnetism" between the two poles of the socialist future (so much of which our civilization needs) and the capitalist past (so much of whose democratic individual freedom we must seek to retain). Its initial and continuing impetus we cannot attribute to anything other than the will-to-power of the ruling nazi group—Hitler and his immediate gang. Its total motive power derives, of course, from many sources—e.g., from the natural development of monopoly capitalism, from the failure of the democracies to act in a friendly way towards the Weimar Government, from the long-standing incapacity of the German people (possibly because of the fact that they were never a part of the Roman Empire) to fit in with the Latin-Slav civilization of the rest of Europe, and from the old-established urge towards a socialism in Germany which forgets that the ideals of a socialist state matter no less than its internal structure.

*A Nation of Automatons*

The essential problem facing the nazi-fascist rulers after attaining power was how to obtain a nation of tools sharpened to subserve their ends of world domination.\* Everything that they have done to science and learning in Europe can be derived from this one aim, pursued with maniacal perseverance and absolute ruthlessness. In the first place, *Anti-Intellectualism*, the fight against all scientific scepticism and rational judgment; for when a régime has ends not susceptible of rational formulation it must needs have recourse to the intuitive, the emotional, and the anti-intellectual. Then *Racialism* in all its aspects; the belief, commended to the German people by every artifice known to the modern technique of propaganda, that there are pure human races of varying abilities, that some of these are "natural" subject-races, and that the dominant master-race is German. A more shameless flying in the face of established scientific fact has never been known in human history. There follows *Wehrwissenschaft*, the imprisonment of science within the sharp bounds of what is of military value, and the discouragement of all pure research and free scientific speculation. Finally, the *Führerprinzip*, the doctrine that men are neither morally nor intellectually capable of independent action, but must always accept the orders of some few of their number who are born endowed with such gifts of leadership as to require absolute obedience. It is worth while to take up each of these trends in turn, listening to what the apologists of the nazis have to say, and viewing the effect that they have had on international science. .

\* "A programme of power masquerading as a social ideal"; M. Oakeshott, *Social and Political Doctrines of Contemporary Europe*, p. xxii.

*Anti-Intellectualism*

Naturally anti-intellectualism has always been the enemy of science.\* In modern thought it has had plenty of representatives in non-nazi regions, such as the theological absolutism of Karl Barth (himself later an exile from nazi oppression) and the cult of the solar plexus publicized by that eccentric genius D. H. Lawrence. But the nazis have brought it to its highest point. "The moral laws of God for the tribe," says Stapel, "successfully resist all efforts to make them into any rational system." "The [National Socialist] revolution of the people is *pure* eruption (*Aufbruch*), *pure* process," wrote Freyer, of which statement it has been remarked that no better designation could be imagined for a process designed to make the mighty mightier than before. In such universities as have continued to function in nazi Germany, disparagement of the intellect is officially undertaken. Here is an extract from a speech by the Rector of Frankfurt University, Kriech, in 1935:—

"Blood and soil, as fundamental forces of life, are the symbols of the national-political point of view, and the heroic style of life. By them the ground is prepared for a new form of education. What does blood mean to us? We cannot rest satisfied with the teachings of physics, chemistry, or medicine. From the earliest dawn of the race this blood, this shadowy stream of life, has had a symbolic significance, and leads us into the realms

\* This statement requires qualification. In the sixteenth and seventeenth centuries in Europe there was a certain alliance between the mystical theologians and the early scientists, while the traditional Aristotelians were united with the scholastic theologians (by then somewhat petrified) in another camp. But this alliance, which arose because the mystical theologians were prepared to accept the possibility of magic and hence that certain effects could be produced by *doing* things manually, while the rational theologians were not, was only temporary.

of metaphysics. Blood is the builder of the body and the source of the spirit of the race. In blood lurks our ancestral inheritance, in blood is embodied the race, from blood arises the character and destiny of man; blood is to man the hidden under-current, the symbol of the stream of life from which man can arise and ascend to the regions of light, of spirit, and of knowledge."

In all the pronouncements of nazi writers this sinister and empty rhetoric \* replaces the exhortations to that brotherly investigation of nature which is the hallmark of "places of sound learning and religious education." In his own book Hitler wrote:—

"The State must throw the whole weight of its intellectual machinery not into pumping children full of knowledge, but into the production of bodies absolutely healthy. The development of mental capacity is only of secondary importance. Our first aim must be the development of character, especially of will-power, and a readiness to take responsibility; scientific training should follow far behind" (*Mein Kampf*).

"What is the purpose of University education?" wrote Krieck in another place. "It is not objective science, which was formerly the purpose of University training, but the heroic science of the soldier, the militant and fighting science."

In succeeding paragraphs we shall find many further examples of the fight of the nazis against reason. Its origin is plainly due to the impossibility of stating the aims of nazi imperialism in rational terms. Ideals of human community, of the right to work and play at peace with one's fellow-men, these have a rational appeal; not so the ideal of throwing away one's life in battle for some insubstantial glorification of Germany,

\* Cf. A. Rosenberg, *Blut & Ehre* (1937), as an example.

or the leader's honour, or the domination of one's people over other peoples in no way obviously inferior or objectionable. Where rational persuasion is impossible recourse must be had to the "dark destiny incarnated in the blood of the master-race" or some such emotional fetish. But this is by no means a bad sign. For all history shows that rationalism has been the tool and armour of rising social classes, and the very fact that the nazis operate with its antithesis reveals their intrinsic despair, reveals that time is not on their side.\* The devil rages, as it says in Scripture, "for he knoweth that he hath but a short time".

### *The Chinese our Intellectual Allies*

A point not generally recognized which arises here is that the struggle of China against Japanese aggression is basically identical with that of Western democratic thought against nazi-fascism.† Chinese civilization, which owes its unique qualities to its wonderful combination of the romantic and the rational, is based on the sincerely philanthropic rationalism of Confucius (overlaid though this was in later ages by Buddhist pessimism and Taoist mysticism). The Chinese are defending the rationality of man against a mystical racial-national spirit quite akin to the spirit of nazism, but equipped with a special religious system of indigenous origin. The notorious persecution of liberal Japanese scholars who have dared to venture the doubt whether the Japanese Emperor is really descended from the sun is quite analogous to events in Germany. And we may perhaps glimpse the cynical nature of the system if we remember that the Japanese Emperor is no demi-god but a marine biologist, who would ask nothing better than to be left in peace to his studies.

\* Cf. F. Foldes, "The Ideological Rôle of Racialism," *Modern Quarterly*, 1939, vol. 3, p. 262.

† See the books of Lin Yu-Tang (e.g., *My Country and My People*), and Hu Shih, *Forum*, Dec., 1936.

The value of Japanese irrationalism is fully appreciated at the western end of the Axis, as witness the following quotation from Ludendorff :—

“ The peoples which have been Christianized no longer find themselves in the happy position, like the Japanese people, of possessing a specifically racial religion such as Shintoism, founded in the cohesion of government and people, of people and army, and of the whole of ethnic life ” (*Totalitarian War*).

### Racialism

Since racialism rests on a basis devoid of scientific support it might be regarded as a department of anti-intellectualism. Its historial rôle has always been similar. In 1853 Gobineau, a disgruntled aristocrat, conceived that a body of racialist theory would strengthen the hands of what remained of feudal aristocracy (which was not so much as he thought) against the forces of bourgeois capitalism.\* In our own time the same set of ideas has arisen to aid in stabilizing the present economic system of Germany while the nazi leaders assure their world-domination. Here it will hardly be necessary to devote any space to a consideration of the scientific refutation of racialism, since this has been very well done in books such as *We Europeans*, by Huxley, Haddon, and Carr-Saunders. It must suffice to say that the notion that modern nations are biological “ races,” and that conflicts between these national unities are “ biologically inevitable,” possesses not a shred of scientific justification. The Christian aphorism, “ He hath made of one blood all nations that are

\* It is interesting that Gobineau was opposed in his own day both by the eminent pathologist Rudolf Virchow and by John Stuart Mill, whose observations on him demand quotation : “ Of all the vulgar modes of escaping from the consideration of the effect of social and moral influences on the human mind, the most vulgar is that of attributing the diversities of conduct and character to inherent natural differences.”

upon the earth," is abundantly supported by all that modern science has discovered, whether in palaeontology, archaeology, ethnology, the study of blood-groups and other physical and chemical genetic characteristics, or all the various departments of anthropology. That there are differences between different human groups is of course undeniable, but the infinite overlapping of characteristics makes it certain that there are no "pure" groups to be found anywhere in the world. We do not yet know enough to say whether there are really any differences in intelligence, assuming perfect equality of opportunity, and until we have positive evidence that all groups are not equally able to make valuable contributions to the benefit of humanity we must act on the assumption that all the groups are, in order to provide the best conditions for getting them. In those parts of the world, indeed, where races meet in conditions of almost absolute educational equality, such as Trinidad, experienced teachers will freely admit that there are no detectable differences between the performances of Whites, Chinese, Indians, Negroes, and Caribs. The bestiality of the attacks of the Nazis upon the Jews and of the Japanese upon the Chinese, especially when it is remembered that these things have been done as part of a policy of terrorism and smoke-screening, can be regarded only as a demonstration of the results of fostering the evil in man's nature instead of sublimating it to socially-valuable ends.

The trouble about the eugenic movement, upon the ideas of which much of Nazi racialism at first claimed to be based, is that even when it has been decided just what physical type is desired, there remains the impossibility of breeding for it in human society while retaining any liberty of choice in sex relations; and little or nothing is known about the inheritance of mental characteristics, which are anyway much more important for society. Moreover, the sterilization of the feeble-minded and other defectives cannot achieve anything very rapidly, since the great majority of these

arise not from former defectives, but from socially valuable people who happen to be carrying the genes for the abnormalities. Above all, the introduction of sterilization in a society still based on privilege of cash and class amounts to "monkeying with the works." Biological engineering in an unstable and unhealthy social order is a dangerous game.

Nazi writers affect to take the idea of the Nordic, Germanic, or "Aryan" race with great seriousness, but this has not prevented the conferring of certificates of "honorary Aryanship" upon certain men of Jewish or partly Jewish origin whom it was important for them to retain in Germany under conditions of more or less tolerable existence.\*

\* On the other hand Jewish men of science, or even those who support theories proposed by Jewish men of science (i.e., "Jews in the Nuremberg sense"), have been expelled from the German scientific societies. Here are transcriptions of actual letters connected with this:—

"Göttingen, 1st Dec., 1938.

"To all full Members, Foreign Members, and Corresponding Members of the Academy of Sciences at Göttingen, within the German Reich.

"In the following we beg to submit to your attention part of a decree of *Reichsminister f. Wissenschaft, Erziehung. u. Volksbildung* (WE Nr. 2633, dated 15th Nov., 1938). According to this, Jews, persons of mixed blood, as defined by the Reich's citizenship law, and lastly any persons having any relationships to Jews, can no longer remain Members of the Academy. We ask you therefore, to send in, if necessary, the declarations mentioned below.

The Secretary of the  
Math.-Physical Section  
(Signed) Rein

The Secretary of the  
Philol.-Historical Section  
(Signed) Kees."

*Copy*

"By introducing into the Statutes the Regulation that none but Reich citizens shall be full members, a guarantee will be established that Jews, by the definition of the Reich citizenship law, can not in future be elected. It is clear that the same principle should be observed in electing corresponding and honorary members. For my part I (the *Reichskultminister*) will in the same way not confirm

Nor did it hinder the proclamation that the Japanese were to be regarded as " Aryans " within the meaning of the Act. Political necessity is seen again in the fact that typical books of elementary biology, such as Karl Brohmer's *Grundriss einer national-socialistischen Biologie*, implicitly assume throughout that the highest social entities conceivable by man are the national states of to-day, especially Germany. The analogy of the ant-hill and the hive of bees is constantly referred to, in utter disregard of the enormous differences between the nervous organisation of the colonial insects and the social primates (ourselves).

### *Germans Must Think with their Blood*

Nothing can exceed the presumption of the nazi writers in regarding German culture as the greatest contribution ever made to human thought and science.

" The blood substance of the German race," wrote Frank (as quoted in the *Times*, Oct. 10, 1937), " constitutes so pre-eminent and unique an asset to the world that we should be justified

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the election of a member of non-German nationality if he is a Jew by definition of the law.

" As far as the present body of members is concerned, the aim should be that full and honorary members who do not satisfy the said conditions should be removed from the roll of the Academy. At first those few Jews who are still members should be urged in the appropriate way to declare their membership ended of their own accord. I wish the same measure to be taken with the Jewish corresponding members in so far as they are Reich subjects. It is in accordance with basic philosophic (*weltanschaulichen*) principles that persons of mixed blood and members having relationship to Jews (*jüdisch versippt*) should be eliminated in the same way."

And this for a scientific academy of old and illustrious traditions to which, before the nazi age, election had been purely on grounds of scientific attainments and service.

in counting it the duty of the entire human race, in gratitude, to safeguard the Germanic element."

But while they all agree about this, they at once begin to disagree when, applying their racialism to the scientists themselves, they try to define in what way non-German science is so inferior and German science so pre-eminent. They are all at one in stating that "science is a product of Blood" (Rosenberg) and that "We do not know science, but only that science which is valid for us Nazis" (Kriech), or

"The achievements of science are not to be judged by the abstract ideal of the discovery of truth, but by their value for the German people. The principle of Science for Life's sake, which is opposed to liberalism, must replace the principle of Science for the sake of knowledge. The concept that twice two make four is somehow differently tinged in the minds of a German, a Frenchman, or a Negro" (Hommes).

or

"It becomes more and more urgent to lay the foundations of a race-bound (*artsgemäss*) scientific knowledge" (Schulze-Soelde).

But exactly what they are fighting *against* in science, and what its characteristics are, is by no means clear.

### *The Renegade Physicist of Heidelberg*

P. Lenard, the Heidelberg physicist, is one of the very few formerly eminent scientists who have ardently supported the nazi movement.\* "As a thinker," says Rosenberg (quoted in *Nature*, 1937, June 12, p. 983), "Professor Lenard has taught that all knowledge is not the same, but that souls of alien races produce bodies

\* See e.g. his *Der deutsche Naturforscher, sein Kampf um nordische Forschung* (1937).

of knowledge of quite different spiritual content." Lenard has frequently declared that "The Jews are absolutely unsuited for science" (e.g., in the introduction to his book *Deutsche Physik*), and this although more than twenty-five per cent. of Germany's Nobel Prize-winners were Jews; and elsewhere, "Science has never started except from a basis of knowledge gained by Aryans." But in his dedication speech at the Physics Institute at Heidelberg in 1935 he said, "I hope that this Institute may long stand as a battle-flag against the Asiatic spirit in Science," apparently a hit at the barbarous Mongolians of Moscow, whose output of first-class physics was by that year beginning to command world-wide admiration. One of the writers on race-bound science, Jaensch, has attempted to describe the qualities of "Modern or French," "Jewish," "English," and "German" science. "Modern or French" science he characterizes as "mechanistic, Cartesian, and dualistic" (neglecting certain inconvenient witnesses such as Bichat and Bergson). "Jewish" science is, according to him, "mathematical, full of non-material spirituality, purely intellectual, idealistic, projectionist" (though there has always been much materialism associated with the Jewish tradition, and Kant, Hegel, and Berkeley were not Jews). Typical "English" science he described as a "conglomeration of unrelated theories" (an odd designation for the stock which contributed Clerk-Maxwell, Charles Darwin, and Willard Gibbs). Finally, "German" science is vitalistic, organicistic, absorptive, and empirical," keeping right down close to the Blood and Soil. With this description Lenard in general agrees; for him the Aryan spirit is "empirical, anti-theoretical, fact-accumulating, unspeculative, unmathermatical, averse from paradox, etc., etc." But the other two greatest self-constituted experts on racialism in science, H. Günther and F. L. Clauss, make science "in the genuine, creative, sense of the term the exclusive privilege of the eruptive, extensive, plastic, soul inherent in the Nordic

race. Its dull, nondescript, counter-type, the 'Turanian' or 'Ostic' race, is passive, torpid, immobile, introverted, and can produce only scientists of the fact-collecting, filing, labelling sort, useful in their way, but devoid of speculative genius." Since experts differ so diametrically in the reasons they give for believing German science to be so pre-eminent, we are led to the conclusion that they knew beforehand the results at which they were going to arrive, and that so long as they produce what is essentially propaganda for the nazi system, it does not much matter what exactly they say. The tragedy lies in the condition of a great nation which can allow such men to be its mouthpieces.

The whole development of civilization hitherto has proceeded on the assumption, tested a million times, that a fact of nature is a fact, if well and truly observed, whatever may be the race, colour, or creed of the observer, and a scientific hypothesis is a good one if it is found to help in the correlation of facts, whatever may be the race, colour, or creed of the framer of it. Science is thus, and always will be, international, rational, impartial, autonomous, independent, and truly totalitarian. Against this fundamental truth the nazis foam with all the weapons of insane nationalism :—

"Living in the consciousness of one's nation," writes Moeller-Brück, "means living in consciousness of its values. The Tribe is our Universe. The proletariat must adjust its revolutionary dynamics to the iron truth that on this earth one nation is the other's 'natural enemy.' What we must keep out at all cost is the formation of an International in which all differences are dissolved, a world-wide fraternity of the intellectuals of all countries, of all scientific, and of course of all moral, authorities on earth."

And Hommes writes :—

"The only test of scientific truth is the firm shape of popular life which, reflected in the con-

sciousness of the Folk . . . needs no corroboration or justification by the persuasion of the individual intellect."

Thus the nazis furiously rage together against all three Internationals—the Black, the Red, and the White. But ultimately none of these can be overthrown. The Black International of the Church rests, it is true, primarily upon certain beliefs, but these have arisen in history from the very nature of man himself, and so can never disappear, however different the forms may be in which they manifest themselves. The Red International of Labour has been based on the existence of deep-lying forces of social evolution, glimpsed, as it were, by social astronomers and never to be overcome by fascist ranting, however desperate. But, above all, the White International of Science is founded in the ever-changing, ever-constant rock of Nature herself, and is impregnable thereon.

We have already mentioned "German Biology" and "German Physics"; there is also "German Mathematics." A periodical under this title (*Deutsche Mathematik*) was founded in 1936, the editorial of which stated that "we see everything from the point of view of the mathematical achievement of our people," and went on to say that the relativity theory was intended only to spread Bolshevism and immorality. A curious attitude regarding mathematics was that revealed in Lenard's comments on Heinrich Hertz's *Mechanics* :—

"The publication of this work, which I saw to after Hertz's death, often gave me great difficulties, as I could follow his trains of thought only with an effort. I did not recognize until later that they were the trains of thought of an alien race, and so necessarily different from my own."

Many of us have had the experience of being able to follow the trains of thought of masters of our subject only with great difficulty, but in civilized countries

this is more usually put down to the inadequacies of the reader than to the racial deficiencies of the writer. It is sad to see how these noxious ideas penetrate throughout the world. Even in New York City, in bookshops not far from 3rd Avenue and 68th Street, the whole gamut of race-hatred propaganda can be purchased, though no doubt few people ever buy it.

So bankrupt is the racial conception in science that, besides the Jewish scientists themselves, it has been necessary to invent a new category, that of the "White Jews"—namely, non-Jewish scientists who support theories proposed by Jews. This was the theme of an editorial in the organ of the Black-Guards *Das Schwarze Korps* on July 15, 1937 (see *Nature* for that year):—

"There is one sphere in particular where we meet the spirit of the White Jews in its most intensive form, namely, in science. To purge science of this Jewish spirit is our most urgent task. For science represents the key position from which intellectual Judaism can always regain a significant influence on all spheres of national life."

The eminent physicists Jordan, Heisenberg, and Sommerfeld were all at the same time denounced as "White Jews."

We may conclude this anthology with a few passages taken from the introduction to Lenard's *Deutsche Physik*, valuable because they were not written by some paid hanger-on of Dr. Goebbels's Ministry but by a man who formerly enjoyed a more or less well-deserved international scientific reputation. A certain amount of heckling in the manner of Thomas Carlyle is irresistible here.

"In order to characterise Jewish Physics," he says, "one may be justified in recalling the activity of its most outstanding representative, the probably pure-blooded Jew, A. Einstein. His relativity theories were intended to reshape and rule

the whole of physics. Confronted with reality they have now completely broken down." (Only in Professor Lenard's imagination.) "Probably they were never even intended to be true. The Jew conspicuously lacks an understanding for truth, for a more than merely apparent agreement with that reality which exists independently of human thinking, and in this he finds himself in contrast with the will for truth of the Aryan scholar, which is as boundless as it is painstaking.

"Strangely enough, truth and reality seem to the Jew not to have a particular meaning or to differ from untruth, but they are to him rather one of the many existing different possibilities of human thought." (Was it not Eddington, a "full-blooded Aryan," who pointed out that the method of science is to explore all theoretical possibilities, not only those which seem actually to be realized in Nature?) "The impertinence of the unrestrained Jew" (continues this unrestrained Aryan), "taken together with the clever help of his co-racials" (in Lenard's case, the Gestapo), "made possible the construction of a large body of Jewish physics which already fills libraries. The eagerness to make public untested thought, characteristic of the Jewish mentality" (and also, one would have thought, of ambitious young scientists the world over), "proved contagious. Not only did it produce personal advantages, such as priority claims and Jewish applause for Jews, but in sum it lowered the level of German science." (We shall shortly discuss whether nazism has raised its level.) "The great Aryan scientists, on the other hand, were reluctant to come forward with uncertain results, preferring" (modest heroes) "to test their new ideas on reality quietly so as to produce established facts rather than suppositions. In this way rich new bodies of fact came to be published, each of which was a milestone in the advance

of science. In Jewish physics every hypothesis which was afterwards shown to be not quite inadequate was regarded as a milestone. This nullified the Aryan type of activity and did great harm. The alien mentality is paralysing. Everything racially alien is obnoxious to the German people."

Much more could be quoted, but the material is its own condemnation. Stark, Lenard, and the rest never attack the quantum theory of relativity concretely and directly, but content themselves with denunciations and anathemas.

#### *Japanese Copyists of the German Model*

So far the Japanese position-hunters have lagged considerably behind their colleagues at the western end of the triple Axis, but a biologist intimately known to me, who recently occupied a visiting professorship in Japan, informs me that the Japanese Government has appointed a committee of scientists, who themselves have never received any foreign training, to rewrite scientific books more in accordance with Nippon's racial-national spirit. It will be interesting to see what kind of rubbish they produce. As I shall not have occasion to refer again here to the Japanese, I will only add that (although there are some excellent scientific men among them) I found it necessary in a rather comprehensive scientific monograph which I recently completed to discard on account of its poor quality some seventy per cent. of the relevant Japanese literature, while, on the contrary, I did not come across one single Chinese paper which was not worth while, whether as regards the value of the problem undertaken, the internal coherence of the results, or the convincingness of the argument and the conclusions.

#### *Hitler as a Biologist*

Returning now to nazi Germany, it is sometimes urged that the racialist writers quoted above have little or no

significance. But the movement which they represent has always been an integral part of the nazi programme. It has been so because Hitler himself designed that it should be so. No reader of *Mein Kampf* can fail to see that racialism was the foundation-stone of the nazi State. Here is a quotation from Oakeshott's analysis of the racialistic parts of the book :—

"The whole doctrine of National Socialism appears, for Hitler, to be a superstructure built upon the foundation of what he calls 'the iron logic of Nature.' Others have sought to found National Socialism on the alleged chaos, political and economic, of contemporary Western Europe; they represent it as, primarily, an answer to a contemporary situation. But with Hitler this is not so; for him the true foundation is the law of nature which decrees 'the internal exclusiveness of the species of all living beings upon earth,' which decrees that 'each beast mates only with a companion of the same species.' The argument by means of which we pass from this 'obvious truth' to the more complex and sophisticated truths of National Socialist society is, in places, obscure; but it appears to run on these lines. Each beast normally mates with a companion of its own species, but when this is not so (in abnormal circumstances) Nature resists by endowing the offspring with inferior strength and inferior powers of reproduction. This observation leads to the conclusion that the purest stock is always the strongest, and the strongest always the most pure. Both the crossing of species and the mating of 'two creatures of unequal stock' produce inferior offspring. But Nature's will is the continual improvement of all life, and consequently her law is the continuous victory of the stronger species over the weaker species, the stronger elements of a stock over the weaker, the stronger over the weaker race. All

crossing of species, stocks, or races results in weakness; so the law of Nature is against the contamination of species, stocks, and races" (*Social and Political Doctrines of Contemporary Europe*, p. 198).

Thus nothing could exceed the confusion of ideas in Hitler's mind on the subject of race and racial inter-mixture. He would appear to be denying that man forms one single animal species, for only between species is crossing impossible, or if brought about artificially does early death occur. There is absolutely no scientific reason for regarding *Homo sapiens* as other than a single biological species. Certainly Hitler is entirely ignorant of the procedures of those practical geneticists who have obtained, by crossing, new varieties of plants, such as the rustless wheats, of basic importance for the welfare of mankind. Evidently he has never heard of the common biological phenomenon of "hybrid vigour." He does not realize that the only meaning one can attach to the appearance of sex in evolution is that it increased the possibilities of variation by better shuffling of the cards in each mating. He seems unaware that inbreeding is likely to produce much more regrettable effects than the widest inter-racial mixture. The logical conclusion of his ideas would be that once the essential "pure" blond, blue-eyed Nordic Aryan had been found, he should revert to the habits of jelly-fishes and reproduce further only by budding. But all stocks of mankind are equally "pure." Or rather, equally impure. It is hard to avoid the conclusion that we have here a case for the psycho-analyst rather than for the teacher of elementary biology.\*

#### *The Havoc in German Science*

No, racialism is essential in the nazi programme, and it is only in the light of it that we can appreciate the dismissal and exiling of eighteen hundred and eighty

\* Cf. G. M. Morant, "The Racial Doctrine of *Mein Kampf*," *Modern Quarterly*, 1939, vol. 3, p. 248.

scientific men of first-class distinction from the Universities of Germany and Austria between 1933 and the spring of 1938. The number has since then considerably increased. But nazi Germany has not only turned out the good—the bad have been put in instead. Dr. Krieck, whose words have already been quoted, and other Rectors of formerly great universities such as Heidelberg and Frankfurt, were eccentric country schoolmasters called to power by the party which had satisfied their psychological needs. With my own eyes I saw the once-famous Veterinary College in Berlin stripped of its brilliant staff and reduced to a level of unbelievable incompetence. By the law of February, 1934, candidates for teaching posts have to satisfy standards of national consciousness, of physical, moral, political, and racial fitness; so if these are the qualifications required for the teaching of crystallography or immunology we can hardly expect that the standards will be maintained. This point is worth while examining further, and as the time has long gone by for mincing matters I shall mention names.

Whole laboratories have been completely dispersed: for example, the enzyme chemistry institute of Rona, the tissue-culture and experimental morphology institute of Erdmann, and the world-famous department of muscle physiology presided over by Meyerhof. Some of Meyerhof's best colleagues, such as Lohmann, have remained in Germany, but have published nothing for years. The great subject of *Entwicklungsmechanik*, or experimental embryology, founded by a German, Wilhelm Roux, and of the deepest theoretical importance for biology, is to-day a ruin in the country of its origin. Its most outstanding representatives in the younger generation are without exception in exile, or building a new life in the U.S.A., and the chair of Spemann, the doyen of the science, at Freiburg is occupied by a man who, though formerly a good embryologist, is now mainly interested in military aviation. Only one school of experimental embryology of

any importance remains in Germany, that of Seidel on insect development; a shocking decline from the great days of Roux and His, of Haeckel and Rathke.\* Furthermore, the work now being produced in Germany, in such fields as I am in a position to criticize, is not worthy of the best German traditions. Men locally in important positions, such as Schenck in biochemistry, Druckrey and Brock in cell-physiology, Heidermann in comparative physiology, or Ries and Gersch in experimental zoology—all of whose work is representative enough—are not producing scientific work of calibre equal to that which was normal in their country before 1933. They must not, however, be judged too harshly, for we have to remember the poor conditions under which they are working; this we shall return to in a moment.

The scientific journals are, of course, the best test of what has been happening. In size, the *Biochemische Zeitschrift*, the *Zeitschrift f. physiologische Chemie*, and the *Archiv. f. Entwicklungsmechanik* (to name three examples from my own field), even before the war shrank in some issues to a fifth or less of their former size, and their standard would have fallen far lower than it is if the policy of their editors for years past had not been to include contributions regularly from Scandinavia, Switzerland, the Netherlands, Russia,

\* This question cannot be passed over without a reference to the curious fact that Russia, the last country which, on conventionally accepted ideas, would be expected to be interested in a science which has no immediate practical applications, has fostered *Entwicklungsmechanik* as fast as it has declined in Germany. Guided by a few older men, such as Balinsky, Schmalhausen, and Filatov, a large band of younger investigators have made this science into a Russian contribution of first-rate importance to world biology. Soviet confidence in apparently purely theoretical studies has, at any rate in this case, been rewarded by a useful discovery—namely, that it is possible to restore the sight of persons suffering from blindness due to cataract by grafting in parts of the eyes of dead persons who have no further use for them.

Portugal, and even Palestine.\* In other sciences the decline is not so obvious; for example, the bulk of the *Berichte d. deutsch. Chemischen Gesellschaft* has been well maintained, presumably because much of it comes from industrial laboratories and because the spirit of chemistry is *persona grata* with the nazi General Staff on account of her connection with gas warfare.

It seems that few statistics of the decline in German science have been published, so I shall add here some observations of my own on a typical German scientific journal of high reputation, the *Biochemische Zeitschrift*. The number of volumes published annually began to fall as soon as the nazi régime was established, and is still falling:—

Year	No. of Volumes	Year	No. of Volumes
1927	13	1934	7
1928	12	1935	8
1929	13	1936	6
1930	13	1937	6
1931	14	1938	5
1932	13	1939	2
1933	11		

The figures show, furthermore, that even of the work actually published during the nazi period a good deal less than before was German, and a good deal more was non-German. If we take two volumes of the journal at random for the year 1930 and two for the year 1938, we find the following:—

	1930	1938
Number of volumes published	13	5
In two volumes:—		
Number of German papers	55	39
Number of non-German papers	47	47

\* Striking indications that the nazis can forget about racial differences when it serves their purpose to do so.

## Non-German papers divided as follows :—

		1930	1938
Austria . . . . .		5	7
Chile . . . . .		2	
Czechoslovakia . . . . .		1	
Denmark . . . . .		3	2
Holland . . . . .			3
Hungary . . . . .		4	8
India . . . . .			3
Italy . . . . .			1
Japan . . . . .		1	8
Latvia . . . . .			1
Palestine . . . . .		1	
Poland . . . . .			5
Portugal . . . . .		1	
Sweden . . . . .		1	4
Switzerland . . . . .		6	3
U.S.A. . . . .		1	1
U.S.S.R. . . . .		10	
Yugoslavia . . . . .			1

Thus in the sample taken the number of non-German papers remained the same, while the number of German papers declined to below the non-German level. It must be remembered that the total number published, as shown in the decrease in number of volumes appearing, was by 1938 reduced to half its previous value. Biochemists in the smaller European countries tended to send papers rather to the U.S.A. or British journals, or to publish them in the journals of local, sometimes not very widely known, learned societies. The detailed study of the decline of German science, as demonstrated by the periodical publications, is a sociological study of pressing need—the figures given above are the result of only an afternoon's work in the library of the author's own laboratory. Nor do they give any assessment of the decline in the quality of the work. It might be added that in recent years some of the German

scientific journals have adopted some peculiar conventions, such as the separate listing of references to papers by Jewish and non-Jewish scientists.

### *The Mass Dismissals*

Among men of established scientific reputation in Germany some eighteen per cent. were dismissed, though in certain universities the figure rose as high as thirty-two per cent., while many men were compulsorily retired "for political or moral reasons." The total number of scientific men of first-class reputation exiled from Germany and Austria up to the end of 1938 was 1880, from Italy 225,\* from Spain 103, from Czechoslovakia 160, and smaller numbers from other countries such as Poland and Hungary. The organisation which sprang up in England to meet the need for rehabilitation of these men—at first called the Academic Assistance Council and later the Society for the Protection of Science and Learning—has achieved a very important place in English intellectual life. It was presided over, until his death, by Lord Rutherford, the physicist; it numbered on its governing council the names of all the most prominent of Britain's older intellectual leaders; and it succeeded in collecting very considerable sums of money with which to place the refugees in temporary or permanent positions.† Those

\* Cf. for the Italian fascist attack on science and learning see M. Ascoli's article in *Journ. American University Teachers*, 1940, p. 50, and G. Salvemini's book, *Under the Axe of Fascism*.

† The following quotation from its report gives a good idea of the functioning of the S.P.S.L.:—"The office keeps an up-to-date dossier for each displaced scholar, whether he is in foreign refuge or still in his country of origin; files for employment opportunities, and information about the possibilities of assistance in various countries and professions. It thus acts as an international scientific employment exchange. If a South American Government requires the services of a census statistician, or an Australian university needs a colloid chemist, the Society's officers can, from this central register, supply lists of candidates; selected by experts, with full particulars of

permanently placed were distributed in almost equal numbers between Britain and the United States. It would be superfluous here to mention their names in great detail, but we cannot overlook the following—more than twenty-five per cent. of Germany's Nobel Prizewinners: In Physics, Schrödinger, Einstein, Franck, Hertz, Born, and Hess; in Chemistry, Haber; in Physiology, Meyerhof; and in Pharmacology, Loewi. Other famous scholars and scientists who passed through England to the United States are Fajans and Freundlich (Chemistry), Stern (Physics), Courant, Menger, von Mises, and Zygmund (Mathematics), Horkheimer (Law), Lederer (Economics), Panovsky (Art History), Spitzer (Philology), Tillich (Philosophy), and Köhler (Psychology). There are of course many eminent medical men, including a large proportion of the famous Vienna School of Medicine. The establishment of the New School for Social Research in New York after 1933 absorbed many German, and later Austrian, economists, lawyers, and sociologists.

In Great Britain many have also been established—e.g., Born and Simon (Physics), Freud (Psychology), Freundlich (Astronomy), Polanyi (Chemistry), Fraenkel (Philology), Friedmann and Krebs (Biochemistry), Hortega (Physiology), Castillejo and Kantorowicz (Law), Wellesz (Music), Mannheim (Sociology), etc. In 1934 the well-known Warburg Institute of the History of Thought and Art was transferred from Hamburg to London, bringing with it a most valuable contribution to scholarship. The standards of the members of the Warburg Institute are of the highest, and their presence in England and the lectures they organised

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their academic and personal qualifications. If a displaced scholar needs advice about the cost of living in India or about the qualifications called for in the education service of one of the Dominions, the information service enables the officers to supply the information or to put the inquirer in touch with the source from which it can be most readily obtained. Negotiations on behalf of displaced scholars can be initiated by the submission of select lists to appropriate institutions."

proved an extraordinary stimulus to museums, to the Courtauld Institute of Art, and to individual scholars.

The question arises here whether German technique will long be able to maintain the high standard which it has hitherto enjoyed now that its tap-root (pure science) has been so thoroughly cut and poisoned. Any answer to this must at present be quite speculative, but there are many who fully expect that should the present war last a number of years we shall have many examples of serious failures of the German war machine due to inadequate technical backing. It is quite possible that this failure will occur first in the field of public health and epidemiology, for the medical training in Germany has been curtailed for some time past by two years and, in accordance with the "folky" tendency in nazi ideology, "faith-healers" and "nature-healers" of various kinds were granted licences to practise medicine at about the same time as the use of vivisection methods was prohibited by law.\*

### *Science the Slave of Nazi Militarism*

What, then, is the direct cause of this decline in German science? It may be summed up in the one word *Wehrwissenschaft*—the valuation of science only as it can contribute to military efficiency. The nazi-fascist glorification of war is a sufficiently well-known and obvious propaganda trend arising out of the aims of the nazi leaders, but a few examples may be added to the anthology.

"War alone brings up to their highest tension all human energies and puts the stamp of nobility on the peoples who have the courage to meet it" (Mussolini, in *Enciclopedia Italiana*).

"Not a 'community of men of free will' but victorious war, is the true social ideal. It is

\* Cf. J. Schräpel, *Kommt d. volkstümliche Biologie* (1937).

in war that the State displays its true nature" (E. Kaufmann).

"War provides the ground on which the human soul may manifest itself at its fullest heights, in richer forms, and surging from more profound springs, than in any scientific or artistic exploit as such. War is a purifying bath of steel" (Banse).

"It merely matters how, and not for what purpose, we fight" (W. Best).

"The order of human relationships upon earth cannot be kept up except by the struggle, fundamentally tragic, of national egoisms bent on self-assertion" (Haiser).

What is fundamentally tragic here is rather the acceptance by intellectuals and writers of places on the nazi dictator's military band-wagon, whether on account of their own egoism or not we may leave to their consciences.

#### *The Attack on the Schools and Universities*

The rot thus begins in the schools. "The school is the preparation for the Army" (Rust). The periodical *Wehrerziehung* ("Education for Arms") wrote in November 1935 :—

"Teaching in school can give the young Bearer of Race (*Rassenträger*) something that will later be useful to him as Bearer of Arms. Tables can be learnt with horseshoe nails. Logarithms find their most beautiful application in the science of ballistics (artillery). In geography the world war can come into its own limitless rights. History is full to overflowing with instances of war politics. Chemistry has as much application in the military struggle with poison-gas as in the fight for daily bread. Physics problems can best be explained by aid of a motor or a tank. Biological lessons can be taught by the wanderings of peoples in the past

and the forcible constitutions of States. The teaching of foreign languages is particularly bound up with military-political explanations. And in German lessons the great Moltke must be cited no less than Grimm."

After this kind of preparation it can hardly be thought surprising that the young are not interested in science and learning and the arts of peace. But even should a desire be expressed for university training, there are great obstacles in the way. The American statistician, E. Y. Hartshorne, investigated the changes in the student population in Germany between 1933 and 1937, with the following results (*Nature*, 1938, vol. 142, p. 175, July 23) :—

	No. of students in 1937 in % of the figure for 1932
Total average . . . . .	57·8
Mathematics and natural sciences . . . . .	35·6
Classics . . . . .	25·1
Modern languages . . . . .	23·4
Medicine . . . . .	70·2
Journalism . . . . .	169·7
Education . . . . .	142·5

Thus after five years of nazi rule the number of students in German universities had dropped to about half its original value, and those studying science to about one-third. Medical education was not quite so seriously affected, being down to two-thirds, but the enrolment in journalism and education, no doubt owing to the demand caused by Dr. Goebbels's activities, had risen by about a half.

One can see how serious the effect of this trend would be on the flow of young men and women into scientific research. All scientific exiles from Germany tell of the widespread reduction in research facilities and financial

support, the withdrawal of technical aid, and the impossibility of getting graduate students to carry on the work. Even those students who remained were constantly harassed by *Kameradschaften*, work-camp duty, and the like. And in recent years other, more mature, workers in considerable numbers must have been tempted away from pure research by threats, promises of better pay, etc., to join the technical research departments of the General Staff. Nor has the atmosphere in German universities been for many years past one in which free scientific thought is possible. It is easy to talk about the suppression of freedom of thought, and difficult to find concrete instances of what may be meant by it; but perhaps the following quotation from Reichsminister Franck, Leader of the German Jurists, in a speech made by him at Tübingen in 1936 crystallizes the situation as well as anything else I have found:—

“The ideas of Adolf Hitler,” he said, “contain the final truths of every possible scientific knowledge. Nazism provides the only remaining possibility of doing scientific work in Germany. In our opinion there can be only one starting-point for the German historian of law, as for all scientists—namely, the duty to conceive of German history as nothing but the pre-history of German Nazism. We believe that every scientific work (whose purpose is after all to serve the investigation of truth) must coincide in its results with the starting-point of Nazism. The programme of the Nazi party has consequently become the only basis for all scientific investigation. The true Front spirit is more important than scientific discussion.”

With such an attitude there can be no argument. German scientists and scholars had only two choices—to stay and accept an intellectual tyranny never before approached, or to quit and seek haven elsewhere. The

multitude of those who chose the latter course will always remain one of the brightest features in the crown of true German culture, as Germans of future generations will be among the first to recognize.

### Nazi Tribal Mysticism

The apotheosis of Tribalism in nazi ideology has become apparent from what has already been said. Man is considered essentially tribal, amoral, and non-economic. The tribe's affairs are to be settled, not in the distinctly democratic way in which (contrary to popular belief) the affairs of most primitive peoples were and are settled, but by divinely appointed leaders, having the right to unquestioning obedience from the rank and file. There can be "no allegiance of any kind to a higher unit than the tribe" (Brohmer). This is the leadership principle (*Führerprinzip*). It might well, like the racialist set of ideas, be classified as a separate department of the anti-rational front, for the relationship between leader and followers (*Führer-Gefolgschaft Beziehung*) is expressed in the most mystical terms. According to its exponents (e.g., Marr, Stonner, Jung, and Blüher) the blood-tie is mystically holy.\* The leader is a kind of racial genius (*artsgemäss*) who personifies the absorption of individual wills into the will of the State, as if he had the souls of all the individual citizens or folk-comrades (*Volksgenossen*) inside him. He is each one's mystical self. This is indeed leadership from *above*, as opposed to the Christian principle, not often formulated in the past but now to a large extent embodied in socialist practice, of leadership from *within*.

### Nazi Distortions of Science

The aim of the leader will be, of course, the success of the predatory tribe in aggrandizing itself in military

\* An amusing example of this is the volume entitled *Das Volksbuch vom Hitler*—i.e., "von dem," equivalent to "*le* Christ."

domination, and in obtaining (as Ley, the Labour Front boss, has recently reminded us: *Angriff*, Jan., 1940) more food, more clothing, more of every human commodity, than the subject races brought under its heel. In the various arguments brought forward to justify such ideas there are detectable at least two basic distortions of scientific theory. In the first place, the so-called Darwinian doctrine of the struggle of existence is appealed to as justifying the belief that wars between nations as we know them to-day are for ever inevitable. Thus Ludendorff, in his book *Totalitarian War*,\* writes:—

“The people ought to know what constitutes the essence of their *struggle for existence*, and this will not be done by indigestible scientific works on the subject of warfare, but by brief and understandable booklets”

Or:

“No doubt the bombing of populations of open towns is not according to the usages prescribed by the rights of nations, where only the bombing of fortified towns is allowed. But in the *struggle for existence* a people cannot renounce the use of means which are used by their opponents, and the destruction of the enemy's war industries is certainly perfectly legal. Inevitably some of the civilian population will suffer in the process, but this is the case in any purely military operations.”

In the use of these loose phrases none of the German writers ever stop to think what could be meant by “competition.” They speak of “fitness,” but of fitness for what? They overlook the immediately obvious distinction between interspecific and intraspecific competition, although it is a truism in biology that during the course of evolution excessive intraspecific competition has frequently led to the very extinction of the species in question. Thus it is certainly right for man

\* Eng. ed., *The Nation at War* (1936).

to war incessantly with the forces of nature which oppose his will, and with the lower animals which interfere with his business or his well-being, but it is not biologically right for him to engage in internecine war. As for fitness, the only way in which the concept was used by Darwin was to indicate such organisms as left the greatest number of offspring to perpetuate their type in posterity. But, as we have seen, there are no rationally valid grounds for thinking that any one type of mankind is more desirable than any other, and it is therefore clear that, when the world's surface has reached an optimum saturation with human beings of diverse types and colours, the time will have come to fix an optimum rate of reproduction. Humanity alone is capable of such conscious action, for only man's highly developed nervous system is capable of the conscious control of the environment. The wild reproduction urged by the nazi-fascist dictators, who at one and the same time make birth-control knowledge illegal and do all that they can to provide the conditions for making cannon-fodder of the children produced, is analogous to the lemmings of Norway. In these small mammals (and the process happens also in other animal species) fertility and reproduction periodically reach unimaginably high levels, with the result that the balance of nature reasserts itself in the destruction of the animal hordes by epidemic diseases or, in the case of the lemmings, by what seems to be an instinct to march in the search for food over hill and dale down to the shore and, like the Gadarene swine, right into the sea. Nazi population policy looks remarkably like this. In Robert Bridges's description :—

" There is no tradition among the lemmings of Norway  
How their progenitors, when their offspring increased  
Bravely forsook their crowded nests in the snow,  
Swarming upon the plains to ravage field and farm,  
And in unswerving course ate their way to the coast,  
Where plunging down the rocks they swam in the salt sea  
To drowning death; nor have they in acting thus to-day  
Any plan for their journey or prospect in the event."

But man is above all a planner.

The deleterious results of excessive intraspecific competition have been underlined by many of the best students of evolution. For example, as Huxley has pointed out, when polygamy or promiscuity prevails, the selective advantage conferred by characters which promote mating success will be very high. Females will tend to choose the most conspicuous or peculiar male at the mating time. For instance, in animals such as the peacocks or the Argus pheasants there are male characters of the most bizarre sort which, while advantaging their possessor in the struggle for reproduction, must be a real handicap to him in the struggle for individual existence in competition with other animals. In such a case, of course, a balance will eventually be struck at which the favourable slightly outweighs the unfavourable, but extinction may be the fate of such precariously balanced organisms if conditions should rapidly change. Again, the over-production of pollen by anemophilous plants is due to intraspecific competition between pollen-grains. And in the extinct reptiles and in mammals intraspecific competition has led to unwieldy size, over-developed weapons or threat-organs, and over-developed devices of protection. Intraspecific competition among parasites, too, has led to monstrous exaggerations of fertility and complications of the reproductive cycle. Thus species are pushed by excessive intraspecific competition ever further along their line of evolution until they balance precariously upon the edge of extinction.

Another important biological fallacy which underlies the nazi conception of the State is the age-old analogy between the social organism and the animal body with its various members. Just as the animal or man has a brain, a stomach, and feet, so there must be in the social organism thinking parts, digestive parts, and locomotory or defensive parts. The comparison occurs in Pliny, is found poetically expressed in "Coriolanus," used with some caution by Herbert Spencer

and Bagehot, and carried to the pinnacle of absurdity by Morley Roberts in his book *Bio-Politics*. It has of course the effect, and was always intended to have the effect, of impressing upon the worker that his servile position was an inescapable part of the order of nature; hence its value to nazi writers to-day. Its futility arises from the fact that associations of organisms with nervous systems capable of rational thought and action cannot be treated in the same way as associations of living cells, which though of course enormously complicated as compared with simple molecules or atoms, have nevertheless only the primitive properties of assimilation, excretion, contraction, and the like, even though their normal work is in many cases highly specialised.

Indeed, the fallacy (I would almost say, the heresy, in view of its far-reaching evil effects) which underlies the whole nazi approach to man's estate may be summed up in the word "Biologism." There are in the world—it is the clearest of the principles which science has established during the past five centuries—a succession of levels of organisation, not only appearing successively in time (as we learn from the evolution of the world), but now enclosed within each other in successive envelopes.\* There are the levels of the atom, the molecule, the colloidal particle, the micelle, the organelle, the living cell, the tissue or organ, the body of plant or animal, and the association in which the animal lives; and there are associations of associations. The psychological and the sociological levels seem to be parallel, and there are reasons for thinking that they may be identical. During the development of human society the associations are constantly increasing in size, tribes giving place to States, and States to federations and empires. But now it follows from this that sociological evolution is continuous with biological evolution, and

\* For a fuller discussion of this see the present writer's Herbert Spencer Lecture at Oxford, 1937, *Integrative Levels; a Revaluation of the Idea of Progress*; and Sir Charles Sherrington's Gifford Lectures, *Man on His Nature* (1940).

the highly organised state of human society to which we all look forward is not a Utopia, but a necessary consequence of all that has gone before. In so far as the nazis are developing new forms of genuine social organisation, they are contributing, in spite of themselves, to this evolutionary trend; but unfortunately their tribalist psychosis is their utter ruin. We have an unshakable guarantee of their ultimate failure in the belief (based, as I have shown, on the whole course of the world's development through geological as well as pre-historical and historical time) that, however tribal leaders may rave, humanity *will* unite. From this point of view the Church, covered with cobwebs though in the imagination of many it may be, is and always will be right, for the world's greatest religious leaders have been what they were precisely because they understood the trend of humanity towards union. "All under heaven are brothers," said the East; and the West, in its better moods, has replied: "He hath made of one blood all nations upon earth."

Furthermore, from the scientific point of view, the nazi mistake essentially is to suppose that higher levels of organisation can be explained and handled in terms of lower levels. Though boasting so much of their "vitalism," they are strictly analogous to the mechanist biologists of the past, who maintained that all the phenomena of life will some day be explained in terms of the physics and chemistry of the inorganic world. This completely neglected the essential thing that distinguishes living from non-living things—namely, the presence of a higher form of organisation, more complex, more integrated, the nature of which is the fundamental problem of biology. It is not inscrutable by any means, but it is not reducible to the lower levels of organisation. Nor is that high level of organisation which we call human society reducible to lower levels of life—it has its own laws and regularities which must be elucidated on their own level. But this is what the nazis say: "Infra-human nature is the prototype of all

life, appropriate order, and true community" (Prinzhorn). "Man is nothing but a beast of prey" (Spengler); "the 'royal' idea of property implies the extreme degree and necessity of fighting, conquering, annihilating, self-assertion." One assumes that this is not intended to apply to the followers; that would be somewhat inconvenient for the divinely appointed leader.

Such poisonous rubbish would meet with its own condemnation if nazi writers were only to read the best that has been written about those organisations which they so much admire, the ant-hill and the termite colony. In what was perhaps the most profound essay of that modern Aristotle, William Morton Wheeler of Harvard, it is pointed out that the main problem which all communities of social insects had to solve was the socialisation of male aggressiveness. Bees and ants, in general, solved it by restricting the male members to reproductive functions only, and even "liquidating" them when these were accomplished; but the termites, by a process we do not as yet understand, succeeded in producing a form of society in which each different caste (worker, soldier, nasute, reproductive, etc.) is about equally composed of male and female organisms. Thus the termite kingdom of heaven, inherited by the meek (which we may translate as co-operative), has an important lesson for man, as is brought out by another of Wheeler's essays, "Termitodoxa."

So also Robert Bridges, in his long poem, "The Testament of Beauty," where, though in my opinion more consistently taking hold of the wrong end of the philosophical stick than any other modern poet, he sometimes has a fine and applicable passage:—

" Nay, some I have seen will choose a beehive for their sign  
 And gloss their soul-delusion with a muddled thought,  
 Picturing a skep of straw, the beekeeper's device,  
 A millowner's workshop, for totem of their tribe;  
 Not knowing the high goal of our great endeavour  
 Is spiritual attainment, individual worth,  
 At all cost to be sought and at all cost pursued,  
 To be won at all cost and at all cost assured."

But this high development of the individual can be attained only within a collectivism which ensures its possibility for every man capable of it, and only by an extraverted selflessness on the part of the individual which puts the kingdom first and private interests afterwards. In no case are we to model ourselves on the social insects, or on any other animal prototype; man in his society constitutes a new and higher level of social evolution with its own laws and regularities. The nazis have not discovered them.

### *Science in the Dominated Countries*

What of the universities in those countries which have fallen under the yoke of the nazi dictatorship? In certain cases there can be no question that the nazis have used their utmost efforts to destroy and stamp out universities, just as the Japanese did in their invasion of China, and probably for the same reasons—namely, that intellectual centres are certain to be foci for the maintenance and advance of culturally nationalist feeling, whether in language, literature, or scientific traditions. This has been particularly true in Poland, where the buildings were destroyed and the staff dispersed at Warsaw and Poznan, while at Cracow the faculty, including a number of aged men of the highest international distinction, was imprisoned almost to a man in nazi concentration camps.\* It was not long before the

\* What happened to the Polish universities which came under Russian control stands in sharp contrast to the above. I happen to know Poland better than most English scientists, and lectured there a few years ago in all their universities for the *Polskie Towarzystwo Biologicznej*. We have long been in close touch with the biochemical laboratory at Lwów, presided over by one of the three leading world authorities on muscle biochemistry. Numerous letters were received from him and his colleagues after the fall of Poland, indicating that the position at Lwów was very satisfactory; Polish scientists were even invited on lecture tours in other parts of the Soviet Union. Other friends, intimately known to me, after seeing the

deaths of at least sixteen of these men were announced (see *Nature* for 1939), among them the well-known biologist Siedlecki and the historian Chrzanowski. In Czechoslovakia the treatment given to the universities was not quite so brutal, but the University of Prag has been closed indefinitely.

Very little information is as yet available about the condition of universities and research institutes in the captured countries. Not a few German and Austrian exiles were working in laboratories in Norway, Holland, Denmark, Belgium, and France, and of their fate nothing is known. It is, however, known that some of the more important laboratories of chemistry and physics in Paris are filled with German scientists, who are said to be trying (with what success it is difficult to imagine) to force the French scientists to carry out research work for them. Men of world-wide reputation such as Langevin have been imprisoned. In this connection it is very regrettable that more active steps were not taken both by England and the U.S.A. to get the most valuable scientists out of France after the military collapse and the establishment of the puppet Government at Vichy, for such men can do little or nothing now in their own country, and would have powerfully aided the war effort of the democracies. As regards the universities in the Scandinavian countries and in Holland and Belgium, a number of indications have come through that in Bergen, Oslo, Copenhagen, Utrecht, Brussels, etc., they are working on, though under difficulties. Any optimism about their future would however, in my opinion, be entirely out of place.

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destruction of their laboratory in the Nencki Institute at Warsaw by the German bombardment, succeeded in escaping over the Russian frontier, and were given every assistance as well as posts suitable for their qualifications. As this goes to press, the news comes that the University of Lwów has been subject to the greatest oppression since its capture by the nazis, who have shot one of the greatest living mathematicians, the University's Chancellor Bartel.

At the present moment Leviathan has other things on his mind, but at any moment which suits him he has only to turn and put out those candles on the continent of Europe. There is nothing in his record to permit of any hope of permanent safety for them, short of his own utter destruction.

*Nazism as the Attempt to Reverse Social Evolution*

K. Polanyi, in his essay in *Christianity and the Social Revolution*, has made one of the acutest characterizations of the nazi mentality :—

“ Socialism and Fascism take alternative roads to conditions of closer human community. But the nazi-fascist road is illusionist. It involves regression, but regression how far back ?

“ The German nationalists, reacting against the treaty of Versailles, proposed to go back beyond 1918. Reactionary romantics like Moeller-Brück, decrying the principles of the French Revolution, proposed to go back beyond 1789. Spann and the ‘ German Christians ’ so-called, proclaimed a Counter-Renaissance, thus extending the regression to half a millennium, and introducing a new mediævalism in the name of Organismic Totality (*Ganzheit*). The German Faith Movement, wholly rejecting Christianity, realized that unless we put the clock back by full two thousand years there is neither safety nor permanence in reaction. It was left to Klages to show that the mere destruction of Christianity is not enough. In his Vitalism he melts body and soul into one and casts mind out altogether, making the human individual melt into the animal tribe, and achieving a regression of at least ten thousand years.”

But social evolution is not a reversible process, and those who try to reverse it will break their necks.

Enough has now been said to show that the nazi movement, inspired by Adolf Hitler, has been forced—in the pursuit of his aim of irrational world domination, possible only at this particular stage of the world's history—to attack the great international movement of science and scholarship with such fury that it now faces the gravest crisis of its history. German science has been largely destroyed, or at least severely damaged; how long will it be before the rest of intellectual Europe has likewise been made desolate?

Should the nazis be defeated, our watch will indeed not be over, since fascist ideas in other guise may spring up where we would least be expecting them, on our own side of the lines, and in our own democratic countries. But should the nazis be victorious, science in Europe may disappear for several generations, and all social progress with it.

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